

Supplement to "A revisional monograph of the Chrotogonini" (Orth. Pyrgomorphidae)

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A year or two ago, the author published a monograph of the Chrotogonini (Kevan, 1959). This contained a very comprehensive bibliography and full synonymies for the different genera and species, but, as is inevitable in such cases, there were a few minor errors and one or two omissions which should be corrected. One of the missing type specimens has come to light and is also reported on. A number of references have also appeared since the Monograph went to press and opportunity is now taken to bring the bibliography more up to date. Not included in the following are references made by Kevan (1959 a), since that article was published consecutively and together with the Monograph, and citations from it would be redundant. Neither are additional locality records for the various species which have since come to hand included since they add nothing to the known pattern of distribution.

In the synonymies and bibliography given by Kevan (1959), the following errors in dates of publication should be corrected. Audinet-Serville's (1838) work, in which the genus *Chrotogonus* is erected, was cited as 1839, the date appearing on the fly-leaf of the volume, but it seems that the work was actually published in December of the previous year. The genus therefore dates from 1838 and not from 1839. In the Monograph, also, the publication by Giglio-Tos (1909) is wrongly cited and paginated as 1908, pp. 1-22, and the title and volume given for Slifer (1940) are incorrect. The correct listings are cited in the references below. Two provisional, 'in press' titles by Kevan (1959 b) and Kevan & Knipper (1959) are listed in the Monograph, but not exactly

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as eventually published; the correct titles and paginations are also given in the reference list below.

The following bibliographical references to the *Chrotogonini* correct or augment those given by Kevan (1959; 1959 a), so far as at present possible. There are doubtless still a small number of further omissions and minor uncorrected errors.

Tribe *Chrotogonini* I. Bolívar, 1884.

The group was first recognized as 'Sub-tribus *Chrotogonae*' by Bolívar (1884). Yakobson (1902) was the next to use a group name and the first to employ '*Chrotogonini*', but Bolívar's usage was not merely as a generic plural (which would be '*Chrotogoni*'), so that authorship and date of the tribal name should be accredited to him. The following references to the tribe have appeared since the publication of the Monograph:

- Chrotogonini*: Kevan & Knipper, 1959: 269 [diagnosis]; Kevan, 1961: 204; Banerjee & Kevan, 1962: 421 [prosternal tubercle]; Weidner, 1962: 88.
Chrotogoninae [of Chopard]: Kevan, 1961a: 99, table 5 [does "not deserve more than tribal status"].

Genus *Caconda* I. Bolívar, 1884.

Caconda: Neave, 1939: 511.

Genus *Tenuitarsus* I. Bolívar, 1904.

Tenuitarsus: Neave, 1940: 423; Kevan & Knipper, 1959: 280, 281 [self-burial]; Weidner, 1962: 69, fig. 5 C (leg) [see also under *T. angustus*], 88.

Tenuitarsus angustus (Blanchard, 1836).

All references to this species were not cited by Kevan (1959) since comprehensive bibliographies had already been given by Kevan (1953) and Johnston (1956). The following, however, were omitted from, or published after, these three sources:

Leptoscirtus Savignyi: Saussure, 1889: 89, 90, 96 [the last two page-references were omitted by Kevan (1953; 1959) and the last by Johnston (1956)].

Tenuitarsus angustatus (sic): Bodenheimer, 1937: 226 [omitted from all three previous bibliographies].

Tenuitarsus angustus: Kevan & Knipper, 1959: 268, 269 [self-burial]; Weidner, 1942: 69, fig. 5 C (as *Tenuitarsus* only, but referred to this species on p. 88), 80, 88, 116 [distribution], 117, fig. 43 [distribution map].

Tenuitarsus evansi: Mirzayan, 1959: 14 [Persian Baluchistan]; Beï-Bienko & Richter, 1960: 8 [from Iran].

Tenuitarsus sp.: Ramchandra Rao, 1960: 286 [S. Baluchistan].

It may be noted that the text-references by Kevan (1959: 180) to "Kevan (1943)" refer, in fact, to Kevan (1953). It should also be noted that an additional male paratype ("co-type") of *T. evansi* Uvarov, 1921 (= *T. angustus*) has come to light in the Zoological Institute in Leningrad.

Genus **Chrotogonus** Audinet-Serville, 1838, *sens. lat.*

Ommexecha: Blanchard, 1845: 266, 269; Girard, 1876: 251 (*partim*).

Chrotogonus: Agassiz, 1848: 242; Chenu, 1859: 79; Scudder, 1884: 67. Brues & Melander, 1932: 57 (as *Chrotogonus*); Neave, 1938: 724; Kevan & Knipper, 1959: 269, 280, 281 [including self-burial]; Kevan, 1962: 50, 92 [digging in soil].

Chrotogonus (sic): Brues, Melander & Carpenter, 1954: 101.

Further references to *Chrotogonus* are given below under *Chrotogonus*, s. str. The above are prior to 1952 (when subgenera were first recognized), or include both subgenera.

Subgenus **Obbiacris** Kevan, 1952.

Chrotogonus (Obbiacris) arenicola Kevan, 1952.

Chrotogonus (Obbiacris) arenicola: Kevan & Knipper, 1959: 269 [self-burial].

Since only the short type series of this species is known, it is of interest to report that one of the specimens collected by the author, and believed to have been destroyed (Kevan, 1952), has been rediscovered. It is a female with the tegmina exceeding the abdomen in length; it

bears the data "Obbia, sand dunes, sparse vegetation, Somalia Mudugh, 31.XII.1946, D. K. Kevan coll."

Subgenus **Chrotogonus** Audinet-Serville, 1838.

The following post-1952 generic references are known to apply only to species of *Chrotogonus*, *s. str.*

Chrotogonus: LePelley, 1959: 92 [spp.; with references to literature, especially regarding crop damage], 274; Key, 1959: 412, 413, 420 [not Australian]; Kevan, 1959 b: 967, 968 (fig.), 969 [distribution]; Kevan & Knipper, 1959: 267-283 [self-burial; diagnosis, p. 269]; Blackith, 1960: 38 [wing-length variation]; Blackith, 1961: 6 [morphometry]; Singh, 1961 a: 3, 4 [food-plants; mouth-parts]; Banerjee & Kevan, 1962: 418, 423, 426, 427, 429, 430 [external and internal morphology]; Weidner, 1962: 69, fig. 6 B (head) [see also under *Ch. homolodemus*], 88. *Chrotogonus* subgen. *Chrotogonus*: Weidner, 1962: 88.

Certain other references to the genus without specific determination can be assigned to their appropriate species under which they are listed below.

Chrotogonus (Chrotogonus) oxypterus (Blanchard, 1836).

[*Chrotogonus*] *oxypterus*: Kevan, 1959: 967, 968 (fig — as *Ch. oxypterus*) [distribution].

In connexion with this species, it should be noted that the "supposed type" of *Chrotogonus scudderi* I. Bolívar, 1884, discussed by Rehn (*in* Kevan, 1959: 123), belongs to this species. I have recently examined this specimen in the Museum of Comparative Zoology at Harvard University and find that Rehn, in kindly endeavouring to assist me, had made two errors:

(1) he misread Scudder's small hand-written cabinet label, mistaking "*Saussurei* Bol." (a synonym of *oxypterus*) for "*Scudderi* Bol." (not difficult to do); and (2), he did not seek the type of *Ch. scudderi* in the correct section of the Harvard collections. North African, including Egyptian, material is segregated with the European collections (where Rehn would scarcely have thought to look—the discovery by myself was by chance), and the only "type" of *Chrotogonus* that Rehn discovered

was the present female, without data (except "Return to S. H. Scudder, 20"), among Asiatic material. The specimen, which bears a bright red type label "M. C. Z. TYPE 15058" has, in fact, no claim to type status, even for *Ch. saussurei* Bolívar, 1884, for no reference is made to Scudder's material in the original description. It is clearly not one of Bolívar's types subsequently sent to Scudder, because it bears the latter's own printed "Return" label. Almost certainly Bolívar had the specimen on loan at the time he described *Ch. saussurei*, but, even so, it cannot truly be regarded as a type. The female lectotype and a male paralectotype are in Vienna (Kevan, 1959); other paralectotypes from Bolívar's collection are in Madrid. The true type of *Ch. scudderi* will be discussed below under *Ch. homalodemus homalodemus*.

Chrotogonus (Chrotogonus) hemipterus Schaum, 1853.

Chrotogonus hemipterus: Gerstaecker, 1869: 205, 220 [Zanzibar, Mombasa]; Anderson, 1916: 41 [Kenya]; LePelley, 1959: 91, 178, 196 [on millets and *Ricinus* in E. Africa]; Phipps, 1959 a: 29, 33, 36, 39-41, 43-44, 47-54 [pp. 36, 39, 40, 42-44, 48-54 as *C. hemipterus* only — discusses size of ovaries, number of eggs, etc., abnormal ovarioles referred to, p. 51, figured, p. 52, fig. 1 b; possible pest status and damage to radishes, p. 54; localities already cited by Kevan (1959)]; Phipps, 1962: 18 [also as *Chrotogonus* sp. (*partim*) — eggs and ovarioles]; Robertson & Chapman, 1962: 59, 90 and 113 (as *Chrotogonus* only), unpaginated Tables 2 & 3 [biology, ecology, ovarioles, Tanganyika]; Banerjee & Kevan, 1962: 416 (as *Ch. hemipterus* only) [morphology].

Chrotogonus rotundatus: LePelley, 1959: 92 [on ground-nuts and legumes in E. Africa].

Chrotogonus fumosus: LePelley, 1959: 92, 108, 170 [as last].

Chrotogonus sp., LePelley, 1959: 108 [on ground-nuts in Tanganyika]; Phipps, 1959 a: 53 [from Rukwa]; Thomas, 1962: 107, 109 [mesosternal bodies]¹.

[*Chrotogonus*] *hemipterus*: Kevan, 1959 b: 967, 968 (fig. — as *Ch. hemipterus*) [distribution].

Chrotogonus (s. str.) *hemipterus*: Kevan & Knipper, 1959: 269-277 (incl. figs. 1, 2, 5-7), 279 (fig. 8), 280-282 [pp. 270-279 and 282 as *Ch. hemipterus* or merely *hemipterus*, figures as "h" only; pp. 280, 281 as *Ch. (Ch.) hemipterus* — self-burial; pairing with *Ch. trachypterus*].

¹ No source of material or other relevant information regarding the identity of Thomas' material is given, but I believe it to be *Ch. hemipterus* sent to her by me in 1954.

Chrotogonus (Chrotogonus) hemipterus: Kevan & Knipper, 1961: 370 [localities already cited by Kevan (1959)].

***Chrotogonus (Chrotogonus) senegalensis abyssinicus* I. Bolívar, 1904.**

Chrotogonus lugubris: Giglio-Tos, 1909: 300 (*partim*) [not 1908: 6 as given by Kevan (1959)].

Chrotogonus lameerei ituriensis: LePelley, 1959: 92 [on eleusine and tobacco in Uganda].

Chrotogonus senegalensis abyssinicus: LePelley, 1959: 92, 143, 180 [as last]; Dirsh, 1959: 61 [from Gondaraba].

Chrotogonus sp., LePelley, 1959: 143, 180 [on tobacco in Uganda].

[*Chrotogonus senegalensis*] *abyssinicus*: Kevan, 1959 b: 967, 968 (fig. — as *Ch. s. abyssinicus*) [distribution].

***Chrotogonus (Chrotogonus) senegalensis gabonicus* I. Bolívar, 1904.**

Ch[rotogonus] s[enegalensis] gabonicus: Kevan, 1959 b: 968 (fig.), 969 (as *gabonicus* only) [distribution].

***Chrotogonus (Chrotogonus) senegalensis sudanicus* Kevan, 1959.**

Ch[rotogonus] s[enegalensis] sudanicus: Kevan, 1959 b: 968 (fig.) [distribution — p. 969 refers to Eastern (or Southern) form (of *Ch. senegalensis*)].

***Chrotogonus (Chrotogonus) senegalensis senegalensis* Krauss, 1877.**

Chrotogonus senegalensis: Saussure, 1894: 581 [from St. Paul de Loanda]; Phipps, 1959: 138, 145, 147 [?wandering associated with ovariole development; a few ecological notes]; Roy, 1961: 110, 112, 114, 118 [from Badi and Riv. Nicolo-Koba (Senegal) — intermediate to next subspecies]; Chapman, 1961: 261 (as *Chrotogonus* only), 263, 268 (as *Chrotogonus* only) referring to p. 269, fig. 6 [eggs, ecology, S. Ghana]; Phipps, 1961: 609 [wandering]; Phipps, 1962: 14, 16, 17, 18 [pp. 16, 17 as *C. senegalensis* only, p. 18 as *Chrotogonus* sp. (*partim*) — eggs and ovarioles, Sierra Leone].

Chrotogonus lugubris: Giglio-Tos, 1909: 300 (*partim*) [not 1908: 6 as given by Kevan (1959)].

Ch[rotogonus] s[enegalensis] senegalensis: Kevan, 1959 b: 968 (fig.), 969 (as *senegalensis* only) [distribution — p. 967 refers to *Ch. senegalensis* (*sens. lat.*)].

Davey (1959) and Davey *et al.* (1959) may have included material of the typical subspecies in their discussions of *Ch. senegalensis*, but they specify semi-arid lands so that the next subspecies is probably the one mainly involved (see below). Such of their material as I have seen is *brevipennis*.

Chrotogonus (Chrotogonus) senegalensis brevipennis Kevan, 1959.

Chrotogonus senegalensis: Davey, 1959: 127 [night-activity]; Davey, Descamps & Demange, 1959: 74 [abundance], 77 and 79 [at light], 81-82 [ecology, biology, eggs, etc., also references to unpublished accounts by O. B. Lean in 1935 and G. Remaudière in 1957]; Boisson, 1961: 28 [no Sporozoa].

Ch[rotogonus] s[enegalensis] brevipennis: Kevan, 1959 b: 968 (fig.) [distribution — p. 969 refers to this subspecies as the Western Sudanese form].

Chrotogonus sp.: Greathead, 1963: 495 [hymenopterous parasite].

Chrotogonus (Chrotogonus) homalodemus homalodemus
(Blanchard, 1836).

A[cridium] (Ommexechea) lugubre: Haan, 1842: 141.

A[cridium] (Ommexechea) homalodema: Haan, 1842: 141.

Ommexechea lugubris: Chenu, 1859: 79.

Chrotogonus lugubris: Longstaff, 1912: 396, 400, 401, 420, 434 [Cairo, Giza, Elephantine I., Aswan. Kosti — material all recorded by Kevan (1959)].

Chrotogonus [sp.], Chopard, 1945: 44 [resemblance to granite soil, Air (cf. Kevan, 1959: 129, 138)].

Chrotogonus sp., Phipps, 1959 a: 53 [brief cross-reference to breeding in Sudan].

Chrotogonus h[omalodemus] homalodemus: Kevan, 1959 b: 968 (fig.), 969 (as *homalodemus* only) [distribution — p. 967 refers to *homalodemus* (*sens. lat.*)]

C[hrotogonus] homalodemus: Singh, 1961: 22 [cross-reference to mites infesting].

Chrotogonus (Chrotogonus) homalodesmus homalodesmus (sic): Weidner, 1962: 69, fig. 6 B (as *Chrotogonus* only, but referred to this species on p. 88), 80, 88, 116 (last p. as *Chrotogonus homalodesmus* only) [distribution].

Chrotogonus homalodemus: Weidner, 1962: 117, fig. 43 [distribution map]; Cloudsley-Thompson, 1963: 161 [Red Sea coastal plain].

The name *Chrotogonus concavus* Kirby, 1914, a synonym of *homalodemus*, is used by Janjua (1959: 234, 245), but almost certainly refers to *Ch. trachypterus* (both subspecies, *q. v.*). It may be noted that *Ch. concavus* was described from Quetta (the locality mentioned by Janjua, *l. c.*: 245) so that it is conceivable that the present species is included. This, however, is very doubtful (see Kevan, 1959: 129, 137; 1959 a: 222). Janjua and Khan (1956), Janjua (1957), Katiyar (1960), and Abbas and Ahmad (1960) also use the name *concavus*, but refer to *Ch. t. trachypterus (q. v.)*.

Kevan (1959: 123) discusses the type of *Chrotogonus scudderi* I. Bolívar, 1884 (which is synonymous with *Ch. h. homalodemus*) and, with the assistance of J. A. G. Rehn, reached the conclusion that the true type was lost. The matter is discussed above under *Ch. oxypterus*. In fact, however, the type of *Ch. scudderi* is in the European (!) collection of Orthoptera at the Museum of Comparative Anatomy, Harvard University. It is a well-preserved, macropterous female with tegmen and hind wing of the right side spread, and having the following measurements, which agree fairly closely with those given by Bolívar (1884): length 21.5, pronotum 4.5, tegmen 17.5, hind femur 10.0 mm. It bears the following labels: (1) a bright red label on which is printed in black "M. C. Z. TYPE 15037; (2) "Return to S. H. Scudder 19" [printed except for the number]; (3) "[Wh]ite Nile" [printed and torn]. There is thus no doubt that this is the missing holotype of *Ch. scudderi*. The locality agrees with that given in the original description ("Nilo") by Bolívar, who, presumably, was unable to interpret the first word which had been torn across. Kevan (1959: 130) tentatively listed the type of *Ch. scudderi* as being from Lower Egypt, but noted the possibility that it might be from the Sudan, which now proves to be the case. Since the type has been rediscovered, the neotype selected by Kevan (1959: 123) now has no status. The holotype agrees well in general appearance with the macropterous specimen figured by Kevan (1959:120, fig. 9).

Chrotogonus (Chrotogonus) homalodemus somalicus Kevan, 1959.

Ch[rotogonus] h[omalodemus] somalicus: Kevan, 1959 b: 968 (fig.) [distribution — p. 969 refers to the subspecies as the Somali form].

Chrotogonus (Chrotogonus) turanicus Kuthy, 1905¹.

[*Chrotogonus*] *turanicus*: Kevan, 1959 b: 967, 968 (fig. — as *Ch. turanicus*) [distribution].

Ch[rotogonus] turanicus: Kevan & Knipper, 1959: 269, footnote [burying]; Weidner, 1962: 89.

Chrotogonus (Chrotogonus) trachypterus robertsi Kirby, 1914.

Chrotogonus robertsi: Mirzayan, 1959: 14 [crop pest, Kerman and Baluchistan]; Salavatian, 1959: 73 [tobacco, cotton, S. E. Iran]; Janjua, 1959: 245 (not 234) [Quetta Valley, cultivated fields; common throughout hilly tracts; adults May-June]; Beĭ-Bienko & Richter, 1960: 8 [from Iran]; Ramchandra Rao, 1960: 286 [S. Baluchistan].

Chrotogonus concavus: Janjua, 1959: 245 (not 234) [Quetta, 5500 ft., orchards, on grass and weeds; adults common June-July — see also note under *Ch. h. homalodemus* p. 7].

Ch[rotogonus] t[rachypterus] robertsi: Kevan, 1959 b: 968 (fig.), 969 (as *robertsi* only) [distribution].

Chrotogonus trachypterus: Dirsh, 1961: 263 [from Sarobi near Kabul — probably this subspecies].

It is also possible, but not probable, that the reference by Janjua and Khan (1956) to *Chrotogonus* spp. partially includes this subspecies besides the next (*q. v.*). *Ch. robertsi* of Janjua and Khan (1956), Janjua (1957), and Abbas and Ahmad (1960) also almost certainly refers only to the next subspecies.

¹ The types of this species have been destroyed. In Madrid, however, is a male and a female from Kuthy's original series bearing the same data as the types. Of these I select the male as neotype of the species.

Chrotogonus (Chrotogonus) trachypterus trachypterus
(Blanchard, 1836).

A[cridium] (Ommexechea) gracile: Haan, 1842: 143.

Chrotogonus ["several spp."], Mason, 1907: 281 [presumably only this subspecies since observations made at Pusa — eaten by Mynah birds].

Chrotogonus trachypterus: Li & Ma, 1935: 269 [listed erroneously from Formosa, on cotton]; Arora & Singh, 1958: 149-174, figs. 1-35 [comprehensive account of external morphology, including mouthparts, wing tracheation, genitalia]; Nath, Gupta & Aggarwala, 1959: 81, 82, 83, 88 (figs. 2-12), 89, 91-93, 95-101, pl. I [pp. 83, 89, 95-96, 100 as *Chrotogonus* only — histochemistry of lipids and morphological studies of oogenesis]; Latif, Haq & Ahmad, 1959: B. 21 [from Lyallpur]; Latif, Haq & Ahmad, 1959 a: B. 23-24 [description of nymphal stages]; Latif, Haq, Ahmad & Qayyoom, 1959: B. 24-26 [development of ♀ genitalia]; Latif, Qayyoom & Haq, 1959: B26-27 [anatomy of head]; Gupta, Gupta & Nath, 1960: 105-112, figs. 1-22 [histochemistry of spermatogenesis]; Aggarwal, 1960: 147, 148, 150 (figs. 1-4), 152 [pp. 148, 152 as *Chrotogonus* only — histochemistry of oogenesis]; Singh, 1961: 73, 74 [infestation by mites]; Singh, 1961 a: 1-4 [food preferences].

Chrotogornus (sic) sp., Li & Ma, 1935: 269 [on cotton, India and (erroneously) Burma].

Chrotogonus sp.?, Corey, 1940: 302 [chromomere vesicles].

Chrotogonus spp., Janjua & Khan, 1956: 69 [pests of wheat, etc., in Pakistan; brief notes on biology and ecology].

Chrotogonus robertsi: Janjua & Khan, 1956: 69, 72 [sometimes serious pest, plains, W. Pakistan]; Janjua, 1957: 7, 19 [pest of various plants, plains, W. Pakistan; brief note on biology]; Janjua, 1959: 234 (not 245) [on germinating crops and vegetable seedlings, Baluchistan, plains, not above 3000 ft.]; Abbas & Ahmad, 1960: 586 [pest of legumes, common in fallow fields, new-sown lands, grass and low crops; notes on biology; plains, India & Pakistan].

Chrotogonus concavus: Janjua & Khan, 1956: 69, 72 [sporadic pest, plains, W. Pakistan]; Janjua, 1957: 7, 19 [as Janjua (*l. c.*) for *Ch. robertsi* (above)], Janjua, 1959: 234 (not 245) [as last]; Katiyar, 1960: 30, 31, 33, 66 [egg]; Abbas & Ahmad, 1960: 586 [plains, N. W. Pakistan].

Chrotogonus sp., Abbas & Haque, 1957: 51 [effect of insecticides]; Abbas & Haque, 1957 a: 160-170 [as last]; Abbas & Haq[ue], 1959: A. 56 [as last]; Mathur & Singh, 1960: p. ? [damaging *Crotalaria*]; Mathur & Singh, 1961: p. ? [damaging *Shorea robusta*].

Chrotogonus [sp.], Nath, 1957: 968 [histochemical studies and cytoplas-

- mic inclusions]; Nath, 1959: 721 [as last]; Gupta, 1959: 223 [lipids in oocytes]; Nath, Gupta & Aggarwal, 1959: 315 [lipids in ovaries, cross-reference only].
- Chrotogonus brevis*: Janjua, 1959: 245 [Baluchistan, plains cultivated fields; adults common April-June].
- Chrotogonus gracilis*: Key, 1959: 412, 420 [not Australian, synonymy noted].
- Chrotogonus trachypterus trachypterus*: Key, 1959: 412, 420 [see last]; Blackith, 1961: 6 [morphometry]; Banerjee & Kevan, 1962: 416, 418 (as *Chrotogonus* only and as *Chrotogonus* [*t.*] *trachypterus*), 419 fig. 2, 427, 428, fig 7 b [external and internal morphology].
- Ch*[rotogonus] *t*[rachypterus] *trachypterus*: Kevan, 1959 b: 968 (fig.), 969 (as *trachypterus* only) [distribution — p. 967 refers to *trachypterus* (*sens. lat.*)].
- Ch*[rotogonus] (*s. str.*) *trachypterus trachypterus*: Kevan & Knipper, 1959: 269-277 (incl. figs. 1, 3-5) 279 (fig. 8) 280-282 [pp. 270-279 and 282 as *Ch. trachypterus* or merely *trachypterus*, figures as "*t*" only; pp. 280, 281 as *Ch. (Ch.) t. trachypterus* — self-burial; pairing with *Ch. hemipterus*].

Dirsh (1961) refers to *Ch. trachypterus* from Afghanistan, but this presumably refers to the last subspecies (*q. v.*).

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